



April 21, 2010

TREE COUNTRY SC

To honor the first anniversary of the worse fire (in terms of most damaging and costly) in South Carolina history, we have prepared an abbreviated version of our Special Edition Bulletin on the Highway 31 Fire.

Highway 31 Fire Anniversary Special Edition





South Carolina's Most Damaging Wildfire

Earth Day 2009 started off like most others for the South Carolina Forestry Commission, with tree planting ceremonies and other programs stressing the importance of conserving our natural resources. Our state was experiencing a very mild fire season, but shortly after noon Earth Day turned into one that some South Carolinians and most Forestry Commission employees will never forget.



Fire behind homes on Highway 90.

The Pee Dee Regional Dispatch Center received a 911 call at 12:22 pm on Wednesday, April 22, regarding a two-acre wildfire on Woodlawn Drive off of Highway 90 in Horry County. Firefighting units, aircraft and personnel were dispatched immediately. This area of Horry County is historically prone to big fires; so, as with any fire we respond to in this area, there was a lot of concern whether this was going to be the one we had preached about for years – our state was overdue for a big fire.

Steve Jordan (M-2-6) and William Caines (M-2-3) were the first tractor plow units on the scene. They met forester Eric West (BR-10) at the end of Environmental Parkway. They were going to unload to try to catch the head which was racing eastward towards International Drive. Fire was running through the woods towards the Solid Waste Authority's Material Recycling Facility on Triple R Road and across Environmental Parkway when the fire began spotting over International Drive. The firefighters notified dispatch to send more units, it was going to be a bad one.

Mild 2009 Fire Season

South Carolina was experiencing a very mild fire season through April 21, with only 1,796 fires burning 9,792 acres. We doubled that fiscal year acreage with one fire.

5-year average	2,669 fires	15,566 acres
10-year average	3,472 fires	20,612 acres



Fire races behind homes in the Glenmoor subdivision off of Highway 90.

Jordan decided unloading there was not safe with the fire racing and no good anchor point for his firebreak. He thought a backfire would work better in keeping the advancing fire away from the recycling facility. He grabbed his drip torch and ran to tell Caines, who was a couple hundred feet behind him, of his plan. Smoke was getting very thick on the road. When Jordan got to Caines, someone from the Solid Waste Authority yelled to him that his tractor was on fire. Embers had landed on the tractor plow unit, still parked on the transport, and were burning under the seat. Jordan grabbed the extinguisher from the transport and discharged it on the flames. With some help from the fire department, the fire was put out. Jordan cranked his tractor, but it wouldn't move. The hydraulic system had been burned. He had to wait on a spare unit to arrive before returning to suppress the racing wildfire.



Roger Jordan heading to fire behind homes in the Glenmoor subdivision off of Highway 90.

Weather for April 22, 2009

Temperature: 71°

Humidity: 24%

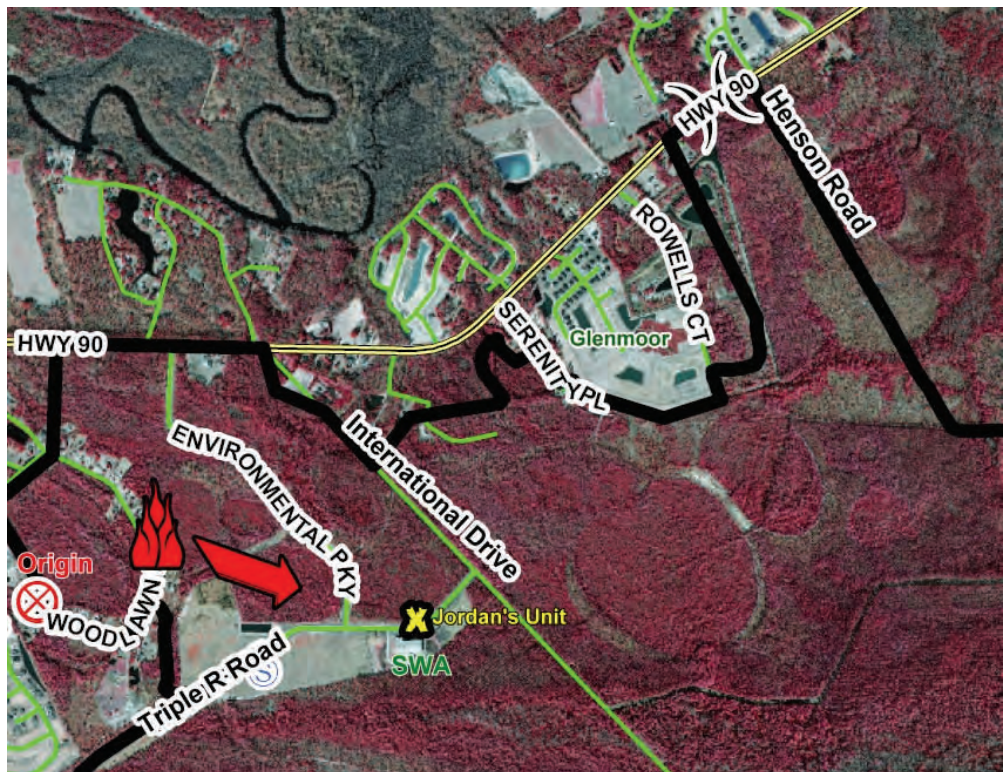
Winds: West at 17 mph, with gusts to 30 mph

This area of Horry County was in a rainfall deficit.

When the firefighters arrived initial size up was around 50 acres, and by the time Air 2-1 (James Price) arrived, it had already grown to about 150 acres with fire running east along Highway 90 and spotting ahead. At that time the fire's head was already east of International Drive along the north

side of Flytrap Road in Lewis Ocean Bay (LOB) Heritage Preserve. Price said, "This fire ain't messing around, it's cooking. It is running, spotting out 300 to 400 yards in front. It's 150 acres easy and has the potential for miles. It is in mature and young pines with typical bay vegetation mix. Downwind it is broken in spots but roads will not help due to the high winds. I hate to guess a potential on this one, but there is not much to stop it. If I have to guess, I would say five to six miles. They are gonna have their hands full here for a day or two."

Any wind-aided fire on a low humidity day is dangerous, but bay fires in thick,



The first units responded to Environmental Parkway at Triple R Road. Other units, as they arrived, started putting in firelines to protect homes along Highway 90.



Wildfire on Lewis Ocean Bay Heritage Preserve.

flammable fuel on wet peat soil are almost unstoppable in those conditions until you run out of fuel or the weather changes.

Available resources were limited due to several other fires in the general area (Gunter's Island, Sandy Island, Pawley's Island, and Andrews). Once the units had controlled those fires, they were sent to Highway 90. As tractor plow units arrived, they started plowing around houses along Highway 90 to protect lives and structures. Foresters on the scene were busy looking for areas to tie in breaks to pinch off the head. Additional units continued to arrive throughout the rest of the day. Hundreds of evacuations were made down Highway 90 as

homes were threatened. Shelters were opened as needed.

The initial attack was on the left flank protecting structures first, then it shifted to catching the head fire and stopping the forward movement of the wildfire. Air-2-1 directed Benjamin Jordan (M-2-5) down Kingston Road towards the power line that runs north/south from the main junction of transmission lines on the Lewis Ocean Bay Heritage Preserve. The tractor plow unit made it a couple of hundred yards down the transmission line before bogging down. Jordan reported that the fire had crossed the transmission line. [Power line rights-of-way are usually wet because they are mainly composed of small shrubs and grasses, which soak up very little water. Utility companies often keep them clear by bush hogging or mowing. Firebreaks are often anchored in these wet, open areas.]

Buist Tract History

Prior to the 1900's, the land was used primarily for turpentine production and low intensity logging. In 1937, George Buist of Charleston sold Socastee Plantation (Lewis Ocean Bay area) to the Southern Kraft Company. The company managed the tract for timber production for their Georgetown mill. In 1951, Southern Kraft merged with International Paper and the land became a part of IP's Woodland Division's holdings.

During WWII, the Buist Tract was used as a bombing and gunnery range for the US Air Force based out of Myrtle Beach AFB. After the war, the owners converted the vast longleaf ecosystem into pine plantations. The longleaf were harvested and the area intensively site prepared with root raking and bedding. Loblolly and slash pine were planted.

The Heritage Trust Program purchased the land from IP in 1989 to protect the Carolina bays and named it the Lewis Ocean Bay Heritage Preserve. Today it is managed by South Carolina Department of Natural Resources (DNR), with the SC Forestry Commission assisting with forest management and prescribed burning operations. Slash, loblolly, longleaf and pond pine are the dominant overstory species in the area. When purchased, the canopy was closed on most of the plantations making them unsuitable for herbaceous plants. Prescribed fire and wildfire have opened the canopy in some areas and native herbaceous species have appeared. Eventually all the slash pine will be replaced with a more suitable pine species.

Of the 19,130 acres that burned from the Highway 31 Fire, approximately 9,000 were located in the Lewis Ocean Bay Heritage Preserve, the rest was privately owned.



Mike Ney (BR-1) arrived around 2:30 pm and assumed the Incident Commander (IC) position. He was very familiar with the area, having done a lot of prescribed burning and fire break plowing for the Department of Natural Resources (DNR) on the Lewis Ocean Bay Heritage Preserve tract. He knew of several prescribed burn areas done since January of this year, some cutover areas, and the location of several wet Carolina bays that could be connected with firebreaks. His plan was to backfire along Henson Road from Highway 90 south to a big prescribed burn area (around 2,000 acres) on Lewis Ocean Bay. This area, with its reduced fuel load, could cause the fire to lessen in intensity and decrease its rate of spread so that it could be fought more easily hoping for containment. However, the extreme fire behavior allowed the fire to burn through the prescribed burn area where he had hoped to catch it. Ney said, "We were hoping that the previously burned areas would slow it down enough to catch it, but the wind and fire behavior caused long range spotovers that outgunned our resources on site."

Fire History of the Area

Three big fires have occurred in this area: the Bombing Range Fire burning 10,162 acres in 1954, the Buist Tract Fire burning 6,005 acres in 1967, and the state's largest wildfire on record – the Clear Pond Fire that consumed 30,000 acres in 1976. In the past ten years, the Forestry Commission has responded to other wildfires in the area: Long Bay, Legends, Walker Woods, Black Creek and Avalon are a few. All of which have threatened homes in the wildland urban interface.



Back at the Regional office, Region Forester John Dickinson was monitoring the weather conditions (high winds and low humidities) and the dispatch radio in regards to the initial operations of the Horry County fire. Because of his experience with fires in that area and the extreme conditions, he called Kenny Robertson (Unit Forester LR-1) and told him to make a plan for deploying the fire tracks and the Type 3 engine. Crews were to be called and on-scene in Horry County by Thursday morning.

Dickinson also made contact with the Horry County Solid Waste Authority and advised them of the wildfire burning in close proximity to their property. Due to previous contacts with the Solid Waste Authority, Dickinson was able to secure the building as the Incident Command Post (ICP). The building had plenty of room, was close to the fire, and had fairly good parking. It was first manned between 8:30-9:00 pm. An extended attack team was also assembled from



Whipping winds caused erratic fire behavior.

Fuel

What makes this area so prone to fires? It is the flammable fuel in combination with the organic peat soil. The fuel consists of a pine overstory with a heavy understory of palmetto, gallberry, wax myrtles, and other waxy vegetation typically found in Carolina bays. Fire is difficult to control and dangerous: it burns under firelines, equipment bogs down easily, there are numerous holes and snags, and trees with no root system fall easily. The fuel type is similar to the highly flammable chaparral fuels in California.



Roger Jordan and Kent Johnson load up to head towards Highway 31.



Firefighting units heading down Highway 31.

the Pee Dee Region (Debbie Price, Lynn Leclair, Justin Smith, Lois Edwards, and Tonya Harrington) and sent to assist with logistical needs. Harold Lawrimore and Richard Faircloth were set up to take over the night operations.

During the course of the afternoon, tractor plow units continued to plow lines behind hundreds of homes off Highway 90, gradually pinching the fire towards the bay. However, another head fire was also spreading rapidly in a southeast direction. Due to the huge volumes of smoke and high winds that kept the smoke low, this southeast spread was not easily detected. Numerous tall antennas and power lines also presented issues in the air for the pilot to locate the head. [Once the head fire crossed International Drive earlier in the day, it is believed to have split at a wet bay, crept around to the other side, then got in heavy fuels again and took off towards Highway 31.] Additional tractor plow units were headed to Horry County. "When we found out that it was pushing Highway 31, I knew we would be in there for days so I alerted Columbia that we may need the IMT (Incident Management Team)", stated Dickinson. "I knew it was at least 5,000 acres so we would be on it for many days and with the Wildland Urban Interface (WUI) situation in that area we would definitely need the IMT." The Duty Officer in Columbia (Darryl Jones) notified Mike Bozzo (IC of Type 2 IMT) to start making calls notifying team members about deploying that evening to Horry County.



Mike Ney and other onscene firefighters, discuss the backburn plan.

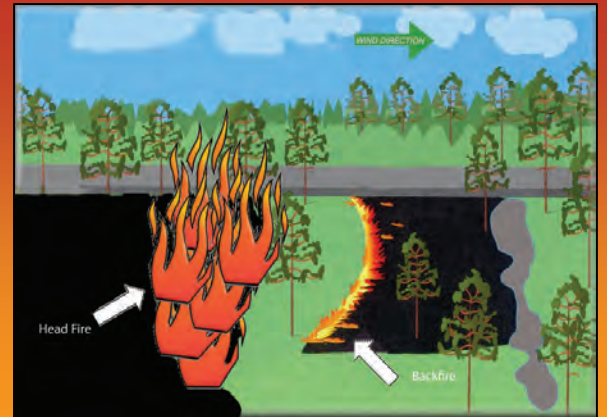


Matthew Schlaefer unloads on Highway 31.

The southeast moving head fire pushed hard and came out at Highway 31 across from the Grand Dunes Golf Course. Fire was burning with four-foot flames through cutovers, and going through the tops of trees in the wooded areas. Highway 31 was closed around 5:45 pm due to smoke and hundred foot flames raging beside it. It wouldn't reopen for days. Once the head came out at the highway, tractor plow units were working on spots in the Grand Dunes area across Highway 31. The golf course had been notified earlier and started running sprinklers, which helped cut the number of spot fires in and around the golf course immensely.

Backfires

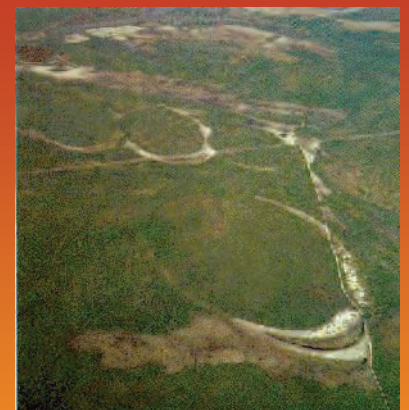
Backfires are set against the wind and ahead of the main fire to consume unburned fuel. Backfires widen firebreaks, and make head fires lose their intensity when they reach areas that have been burned out.



Most of the firefighting forces had been relocated to Highway 31 between Water Tower Road and International Drive by 6:00 pm. Firebreak lines were being put in to pinch off the flanks remaining from the Highway 31 head fire, and other breaks were being put in to assist with a critical backfire that would protect the Black Creek area, Brightwater Senior Living Community and the heavily populated development known as The Farm to the west. The backfire operation was also to prevent the fire from crossing Highway 31 into other WUI communities. The backfire operation began around 6:00 pm with Ney (BR-1) stringing fire 2-3 miles south down Highway 31 and Brandon Craig (BR-2) stringing it down a woods road to tie into International Drive. Tractor plow units were also constructing firebreaks from Water Tower Road towards the transmission lines in an indirect attack on the left flank. Ney said, "Spot fires were a big concern in two areas on Highway 31. The first was about one mile south of Water Tower Road (where we had Glenn Porter and Scotty Scott) and the other was about two and a half miles

Carolina Bays

Lewis Ocean Bay contains one of the most significant group of Carolina bays in South Carolina. Carolina bays are elliptical depressions, oriented northwest/southeast along their axes. They are found in the Coastal plain of the southern Atlantic states and range in size from a few acres to several square miles. The pocosin vegetative community is covered with very dense, almost impenetrable thickets of fetterbush, gallberry, sweet bay and red bay. Under the fuel is a very acidic peat-based soil. There are several theories as to the Carolina bay formations: meteors landed causing the depressions, they were dinosaur beds or playgrounds, and they were covered by the ocean and were big fish/whale beds. Whatever the reason, the bays are found down the entire coast of South Carolina.



Lewis Ocean Bay Preserve is made up of 23 bays. The largest is the Lewis Ocean Bay at approximately 786 acres. The smallest is 2 acres, but most average in size from 30-50 acres. The other unique feature about Lewis Ocean Bay Preserve is that the bays are in complexes – they overlap. There are some isolated bays that DNR prescribed burns, but never on the complexes.

south from Water Tower Road, where we had Benjamin Jordan across Highway 31 catching the spots as soon as they landed."

Air traffic was a concern for Air-2-1. The fire was located between two airports (Myrtle Beach and Grand Strand). Because of this, there were several helicopters and some fixed wing aircraft flying through the fire area making it very hazardous for aircraft suppression assistance. A TFR (Temporary Flight Restriction) was implemented around 10:30 pm to restrict air space around the fire from air curiosity seekers. Pilot Price said, "Heavy smoke and dangerous embers



Head fire comes out at Highway 31.

were enough to worry about without having to worry about running into other aircraft. You could feel the heat from the flames at 700 feet; it was a bad area to be in." [The TFR was lifted on 4/27 after the last National Guard Blackhawk left the area after providing air support with their 700 gallon Bambi Buckets.] The TFR helped tremendously with this problem as all air traffic during the TFR had to submit requests to and be approved by the Air Operation Chief before entering the air space. The Air Ops Chief was filled by John Dickinson after discussing with Bozzo the need for such a position in coordinating all air operations.

By 7:30 pm the Forestry Commission had responded with 16 tractor plow units, 12 support personnel, 1 airplane, and 1 mechanic on the scene. Mixed tactics of fire lines and backfire were being used to help control the wildfire. At this time, the National Weather Service did a spot weather forecast for the area: relative humidity was predicted to continue to recover upward around 78%, winds were to be southwest from 11-16 mph diminishing to 6 mph later in the evening. This spot weather forecast showed favorable conditions for continuing our strong tractor plow attack for the rest of the night. The Forestry Commission's Type 2 IMT (Incident Management Team) had been ordered to assist with the incident and was enroute.

Around 9:00 pm the wind shifted from a northwest to a southwest direction. Flank fires abruptly became several head fires making an intense run to the northeast forcing two tractor plow operators who were bogged down on the central transmission line to deploy their fire shelters. (This was only the second deployment in the Forestry Commission's history.) Not far from there, three additional tractor plow operators were forced to take refuge in a safety zone they constructed on a sand ridge to the east. All firefighters affected by the sudden fire shift escaped unharmed.

At 10:00 pm command of the incident was turned over to Night Operations Chief Harold Lawrimore (BR-4), who has more than 30 years of firefighting experience, and Deputy Ops Chief Richard Faircloth (BR-6), who has 16 years of firefighting experience. The IMT arrived around 10:30 pm at which time Ney briefed team commander Mike Bozzo of the situation. With the head now moving northeast, plans were to construct firebreaks far in front of the head to cut it off in the large cutover areas. However, with the fire moving rapidly, burning intensely and throwing burning embers hundreds of yards ahead, these firebreaks were not going to contain the fire at this point. Tractor plow units in the woods took refuge in safety zones, as

SCFC Support

In addition to the 130 Commission employees who worked on the fire incident, mechanics, pilots, radio technicians, and dispatchers were a few of the support services needed from the agency.

SCFC Equipment Used on the Fire

60 tractor plow units

27 engines

9 other resources (fire tracks, aircraft, tanker)



(top right) State Forester Gene Kodama pumps fuel for a firetrack.

(right) Mechanic Dennis Weaver repairs a ramp.

(left) The Pee Dee Dispatch Center handled the fire calls.



they were trapped by the oncoming fire. Once the fire passed, they would reorganize on Water Tower Road. This safety-minded action lasted until after 1:00 am. Strike Team Leader James Brunson (LR-9) was cut off from Water Tower Road in his pickup and had to seek refuge down Telephone Road to the west.

While the wind shift wreaked havoc on the left flank, six tractor plow units working on the right flank had issues with boggy conditions on the power line and heavy fuels near International Drive. The thick bay fuels broke several radio antennas limiting communication. The conditions on that side of the fire had calmed down. Wind was calm and only there was the weather doing as it had been predicted. The fire was starting to "lay down" like it usually does at night—quite the opposite of the left flank. The units loaded up and repaired antennas. Three other units, that had been assisting with breaks for the backburn on Highway 31, were also finishing their objectives. As units were regrouping on Water Tower Road, another plan was being developed for a unified attack with their primary mission to save the isolated homes in the woods off of Water Tower Road.

Glenn Porter and Scotty Scott (K-3-5 and K-3-8) had safely returned to Water Tower Road, but their transports were not where they left them. They had been moved earlier when fire was spotting over the road where they were parked. Both transports were relocated across the Highway 22 overpass on Water Tower Road beside the back fence to the Barefoot Resort. Lawrimore and Faircloth were taking Porter and Scott to their



Unusual nighttime fire activity.

transports so they could load up and relocate. At 1:17 am Faircloth (Deputy Ops Chief) called the Horry County Dispatch to inform Fire and Rescue that Highway 22 was being closed due to the likelihood that fire would jump it. At 1:32 am he called Horry County 911 requesting Fire and Rescue engines on Highway 22 on the west side of the intersection of Highways 22 and 31. The fire was threatening to jump Highway 22. The plan at the time was to utilize the four-lane Highway 22 as the control line. Forestry Commission tractors and Horry County Fire & Rescue engines would control any spot fires that may occur on the north side of Highway 22. The four had almost reached the overpass when the fire blew up. Gusty winds collaborated with the dry conditions and flammable vegetation to create extreme fire behavior. Lawrimore got on the radio immediately asking for more assistance.



Fire consumes the tops of pines in Lewis Ocean Bay Heritage Preserve.

Between 1:45 - 2:00 am, the winds shifted again from southwest to west and increased in speed. The two separate fire heads moved extremely fast towards the east. This rapid movement was encouraged by the long range spotting of wind blown embers, some the size of grapefruits. The northern head jumped Highway 22 and the southern head raced to the intersection of Highway 22 and Highway 31. Both fire heads jumped the highway barrier with little to no loss of intensity and blew together near the Water Tower Road overpass at Highway 22, behind the Barefoot Resort community. Within minutes numerous homes on the backside of Barefoot Resort were burning due to the extreme fire behavior. Some interior homes ignited from the wind blown embers landing in flammable landscaping and construction materials. At 2:04 am Faircloth called Horry County 911 to notify them that houses along Water Tower Road were burning. Lawrimore got on the radio immediately asking for assistance and called Bozzo who summoned Brad Farmer (Safety Officer on IMT), to come immediately to the scene due to the extreme fire behavior.

[At 1:23 am, observed weather conditions at the Grand Strand Airport in Myrtle Beach, located about 2 miles east of the fire perimeter: Temperature was 66°, relative humidity 35%, and winds (west to southwest 240 degrees) at 8 mph with gusts to 18 mph.]

This was very unusual weather for this time of night (early morning) as temperatures increased and relative humidity decreased; not what you would expect at 1:30 am. But this fire was so big and so intense, it was also creating some of its own weather locally. The relative humidity on the fire may have been as low as 19%. The fire itself generated wind speeds approaching 50 mph. Much stronger gusty winds were interacting with the fire. These winds were most likely generated by the intensity of the fire. Intense fires create very strong convection columns of heat and smoke. The fast rising columns of hot gases cause in-drafts of air to form around the fire feeding more oxygen to the fire and causing it to further intensify. These in-drafts can be extremely strong with suspected wind gusts between 50-60 mph on this particular fire.

Rate of Spread

The estimated rate of spread of the wildfire is 1,100 acres/hour on the night of April 22 and early morning hours of April 23. Flame lengths were at 270 feet and the fire was traveling at 3 ft./second which equals to about 2.45 mph.



When the wind unexpectedly shifted around 1:00 am, the two head fires picked up speed, ran together at Water Tower Road creating a dangerous firestorm, and raced towards Barefoot all within an astonishing 12 minutes. This unprecedented movement destroyed 70 homes in the Barefoot Resort development.

The firestorm resulted in sudden changes in the norm for temperature as it spiked, and from relative humidity as it dropped, combined with gusty winds and highly flammable fuel. The rate of spread during this time is estimated at more than 2 miles per hour, with fire consuming 1,100 acres per hour, with flame lengths reaching 270 feet. The fire was burning with such intensity that radiant heat was drying and igniting fuels far ahead of the fire. This extreme fire behavior has rarely been observed in the state of South Carolina! This firestorm was most likely enhanced by an unusual weather phenomenon.

What is the explanation of this weather phenomenon? Mark Malsick with DNR reviewed the



Glenn Porter's transport on Water Tower Road where it burned over. All power poles down Water Tower in this area had to be replaced.

weather data for April 22, 2009 and made the following observations. "There was a 30+ mph low level jet over the state on 22 April. There was also a very strong 115 mph jet stream aloft and the orientation of the jet aloft, with its right exit region over the state which would have forced subsidence over the state heating and drying the air AND allowing the low level jet winds to mix down to the surface. I do not know the precise fire timeline but the observations show the normally south-south westerly winds jacked up out of the west northwest and relative humidities dropped from 52% to 19% in less than 8 hours on April 22."

"The weather was unpredictable all day", said Ney. "That affected our tactics and strategies. If we had a weather crystal ball to know where it was going

to go, our actions would have been different. The fire caused the lower jet stream to dip lower than normal and combine with the convection column, which caused the "storm". We did the best we could with what we had."

Driving conditions down Water Tower Road were very hazardous with very heavy smoke, hot fire and flaming embers and ash falling everywhere. When the four (Lawrimore, Faircloth, Scott, and Porter) arrived on the other side of the overpass, Porter's transport bed boards were on fire. Scott's transport was okay other than burnt places on the seat so he immediately moved it farther down Water Tower Road. Porter's transport would crank, but it wouldn't move. The air brake lines had been burned and the brakes wouldn't release.



Steve Moore, Debbie Price, Assistant Chief Scott Thompson from Horry County Fire Rescue, and Mike Ney listen as Harold Lawrimore and Richard Faircloth outline what happened overnight.

The transmission lines that ran down Water Tower Road had burned and were falling on the opposite side of the road from the Barefoot Resort. The main power line, that crossed Water Tower Road at the bottom of the overpass behind Porter's transport, fell as he was trying to get his transport to move. This fallen line was live and blocked Water Tower Road from the west -- where all but the two pickups and two transports were parked. The quickest path to the fire was now cut off. They called for a roadblock barricade to be put up immediately for the downed line, and told all SCFC personnel not to come that way. Units and personnel had to get back on Highway 31, travel to Highway 22, then to Highway 90, and take Long Bay Road to reach the other side of Water Tower Road. This would take them 30 minutes longer to reach the area.

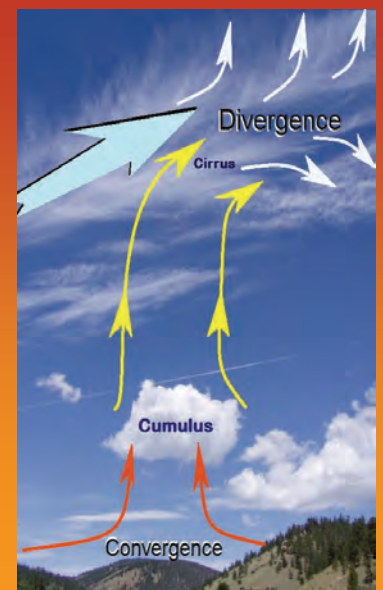
Even if there was a tractor plow unit on the burning side, there was little a tractor could do once fire got into the Barefoot Resort community. With local fire trucks, burning houses and underground utility lines, there was little if anything a tractor plow unit could do in such a

Weather Phenomenon

As the jet stream passed overhead, wind shear produced divergence (the horizontal spreading out of winds) and lowered air density and the air pressure aloft. This pressure reduction caused air from the lower levels to rise and fill in the "void".

This chimney-effect caused by divergence and a lowering of air pressure aloft can be enhanced by strong heating and convergence (the coming together of air) at lower levels.

If this occurs near a wildfire, explosive growth is possible.





Horry County Electric works on fallen lines on Water Tower Road Thursday morning.



Barefoot Resort home destroyed by the fire.

neighborhood. While waiting on all the units to arrive, Lawrimore and Faircloth tried to find roads and places that would be safe to tie lines into on the eastern side of Barefoot Resort. Porter and Scott took one of the pickups and started knocking on doors to help evacuate those who hadn't left earlier. North Myrtle Beach police were on the scene doing the same, and several fire trucks were coming into the community to assist with evacuation before trying to put out the burning homes. Lives were more important than homes. As the neighborhood of 2,500 was evacuated, more local shelters were opened in North Myrtle Beach.

While waiting to get down Water Tower Road — which was blocked with fire trucks and hoses that trucks couldn't get around—Supervisors Chet Foyle and Eric West, and tractor operator Lynn Collins jumped the Barefoot fence when they saw the landscaping around a house on Weatherwood Drive burning. They grabbed the nearest water hoses and water cans and started dousing the fire before it could start burning the home. Propane tanks were hissing so they threw them onto the lawn away from the homes. A tank had already burned out a window and fire was burning in the insulation, so they started pulling the insulation out into the yard and wetting it down. A fire engine had arrived at the house so the three resumed their wildland duties.

Once all the units had relocated on Water Tower Road, Lawrimore held a brief safety meeting to calm them down and give everyone clear instructions. He had half of the units work on the eastern end of Barefoot Resort, putting in line after line behind the homes at the edge of the community. The others worked the northern side of Water Tower Road back towards Highway 90, plowing around every home on their way. Line construction on both sides continued for hours.

By the early daylight, the fire head had blown through and over Barefoot Resort and reached Long Bay Road. Tractor plow crews were able to stop the advance with lines at that point due to the drop in the wind velocity. [Grand Strand Airport weather at 6:53 am: Temperature – 57°, relative humidity - 51%, winds west southwest at 6 mph.] With the head stopped, now the focus shifted to reinforcing lines to prevent it from running again and to establish multiple firebreaks along the flanks as soon as possible. There were still several hot spots within the fire boundary that would need to be handled to avert another run of destruction.

On Thursday morning, additional Forestry Commission tractor plow units, personnel, fire tracks



USFS P3 tanker drops long-term retardant in the Barefoot area.



National Guard Blackhawk makes a water drop near homes on Highway 90.

and brush trucks (engines) were on the way from around the state. The initial attack had shifted into an extended attack. The IMT took over managing the incident. Mike Bozzo became the Incident Commander (IC), resources who had been on the scene since Wednesday afternoon were replaced with fresh personnel.

A SC National Guard helicopter was requested through the Governor's office which ultimately made hundreds of bucket drops (along with four Blackhawks from North Carolina National Guard who arrived on Friday) to assist in holding lines. Approximately 900,000 gallons of water were dropped. Fire departments from all over the state continued to support the suppression efforts along roads and contain hot spots within the Barefoot Resort community. The Department of Transportation, SC Highway Patrol and Horry County Police continued to monitor the highways in the area for smoke and fog, closing and opening them as necessary.

[The Forestry Commission sent its most experienced firefighters and most reliable equipment to the fire from all over the state, which helped keep equipment breakdowns to a minimum. Consequently, due to limited resources available to fight fires over the rest of the state, State Forester Gene Kodama issued a statewide Burning Ban on April 23 and lifted it on the 27th once resources were released from the fire. Fortunately, fire occurrence over the remainder of the state was abnormally low. If occurrence had been normal to high statewide, Commission fire fighting capacity would have been grossly inadequate and many more acres and property would have been lost across the state.]

On Thursday, the fire made major runs on Highway 90 all day. Most of Thursday ground forces spent plowing additional lines and widening existing lines.

With the TFR in place and altitudes assigned to aircraft, the air assault began. Air Ops Chief, John Dickinson said, "We saved quite a few homes. Most people don't understand how hot the fire got Thursday afternoon. A major fire run was beginning also north of Highway 22 near a new subdivision across from Wendy's on Highway 90. Fire was moving north towards



SCFC personnel gather at the Friday evening briefing.

them until line improvements and water drops prevented a major run. It was also spotting over Long Bay. They did a lot of good work Thursday to not let it get out of hand again. We ran the Blackhawk hard. We also did a tanker drop near Barefoot. A Forest Service air tanker was ordered and relocated from Tennessee to North Carolina to make drops of long-term retardant to secure some worrisome areas." [The US Forest Service contract tanker (a P-3 Orion) stationed at the tanker base in Kinston, NC was available for our use. According to Dickinson, "They made one drop Thursday afternoon, and four on Friday, mostly on International Drive towards the Black Creek area that we wanted to protect. The retardant in combination with previously mowed areas on Lewis Ocean Bay Preserve stopped the remnants of the right flanking fire (from the Wednesday Highway 31 rush) cold. The tanker was on standby Saturday and Sunday if we needed it."]



State Forester Gene Kodama speaks with personnel at the staging area.

With fire pushing north all day Thursday, the eastern perimeter had been stopped at Long Bay Road with a few spotovers. The winds were south and southwest the rest of the week so it continued to push north. By Thursday night the fire had ceased growing in size. Unburned areas along International Drive were burned out to prevent a run towards more homes. On Friday, Highway 90 and the Barefoot area were our main concerns. These were areas that could heat up and threaten lives. The four NC National Guard helicopters came in Friday and started with drops up and down Highway 90 and Long Bay Road.

The SCFC IMT met with the chiefs of Horry County Fire Rescue and North Myrtle Beach Fire Department to discuss a unified command to coordinate the suppression efforts by involving them in the development of an Incident Action Plan (IAP). This was accomplished with the help of the Incident Commander from the Lowcountry IMT so that resources could be utilized most effectively and efficiently. The coordinated efforts and input at the planning meetings from all three participating agencies resulted in IAPs for the suppression and mop-up efforts. Horry County GIS provided a person who worked with the Planning Section to provide updated maps, which were very helpful.

Over the next week, Forestry Commission resources focused on establishing additional firelines over the entire fire perimeter and widening existing breaks to ensure containment and control. Operations Chief Mike Ney said, "Heavy mop up was performed within the perimeter and with the assistance of fire departments along the roads. Mop-up activities started within 50 feet of breaks, then later moved to 100 feet from the fireline. All green pockets (unburned fuel along breaks) were to be plowed out or bladed out. The reburn potential was constantly monitored. The air assault of the tanker and helicopter drops continued to hit hot spots and ensure containment around swampy areas (to knock down any potential of fire crossing through). Problem areas were ones that



Jimmy Smith and Steve Marshall use the SCFC fire tracks for mop up.

we couldn't gain access to: swamps with smoldering debris, wet power lines where units couldn't get through, and green pockets that had reburn potential."

Every smoking area within 100 feet of the perimeter had to be saturated with water. Fires in these organic, peat soils can burn underground and reappear days, even months later, and flare up again. The Forestry Commission fire tracks were used to drown these areas with water and foam. Horry County Fire's wildland team set up sprinkler systems in the smoldering areas to assist with the saturation, and they also provided water tenders to refill the fire tracks as needed. Fire Department engines and brush trucks were also used to mop up along the highways and back roads.

By the time the Highway 31 Fire was deemed contained and controlled (declared 100% contained on Tuesday, April 28, and 100% controlled on Wednesday, May 20); it had consumed 19,130 acres of woodland, destroyed 76 homes and damaged 97 others. Fire damages and expenses exceeded \$50 million, but more importantly there were no deaths or injuries reported from the dangerous and ever-shifting fire. Pee Dee Region Forester John Dickinson stated, "Our firefighters and cooperators did an outstanding job with a fire this large and unpredictable not to lose any lives or suffer any injuries."

The impact felt from three major highways being closed for days was crippling to area residents and businesses. Highway 22 was closed from Highway 90 east towards Highway 17 until April 29. Highway 31 was closed from Highway 9 south to International Drive until April 30. Highway 90 was closed and opened as needed. The travel restrictions added hours to normal travel time and congestion on smaller roads was heavy.



The Forestry Commission's Type 2 Incident Management Team managed the fire event with the support of State Forester Gene Kodama, Deputy State Forester Joel Felder, and Protection Chief Darryl Jones. Pictured: (front) Scott Hawkins, Darryl Jones, Michael Weeks, Brad Farmer, Lisa Hartrick-NC, Gene Kodama, Holly Welch, Robert Jones, Michelle Johnson (middle) Sally Browning-NIMO, James Meredith-NIMO, Lois Edwards, Cathy Nordeen, Debbie Kiser, Mike Ney, Ron Holt, Stephanie Kolok (back) Gene Madden-NIMO, Donald Bryant, Barry Farrell, Doug Mills, Steve Moore, Mike Bozzo, John Dickinson, Scott Phillips, Debbie Price, Bill Wiley, Brian Davis, Russell Hubright, David Owen, Joel Felder

This wildfire was the second largest in the state's recorded history, and by far the costliest and most damaging. It also holds the distinction of being one of the most destructive wildland urban interface fires in the eastern United States.

Personnel who assisted in the suppression and management of this fire should be commended on their actions that led to its containment and control in a very dangerous situation. There were a lot of lessons learned and valuable experience gained from the defeat of this wildfire. The Highway 31 Fire that started on Earth Day will provide South Carolina and SCFC employees with stories for years to come.

Origin

The fire originated from the same area as an escaped debris burn on Woodlawn Drive, off of Highway 90 that was conducted on 4/18 and which the Horry County Fire Department responded to. The SC Forestry Commission charged an individual with violating the notification and precautions law and with allowing fire to spread to lands of another.

Outside Resources

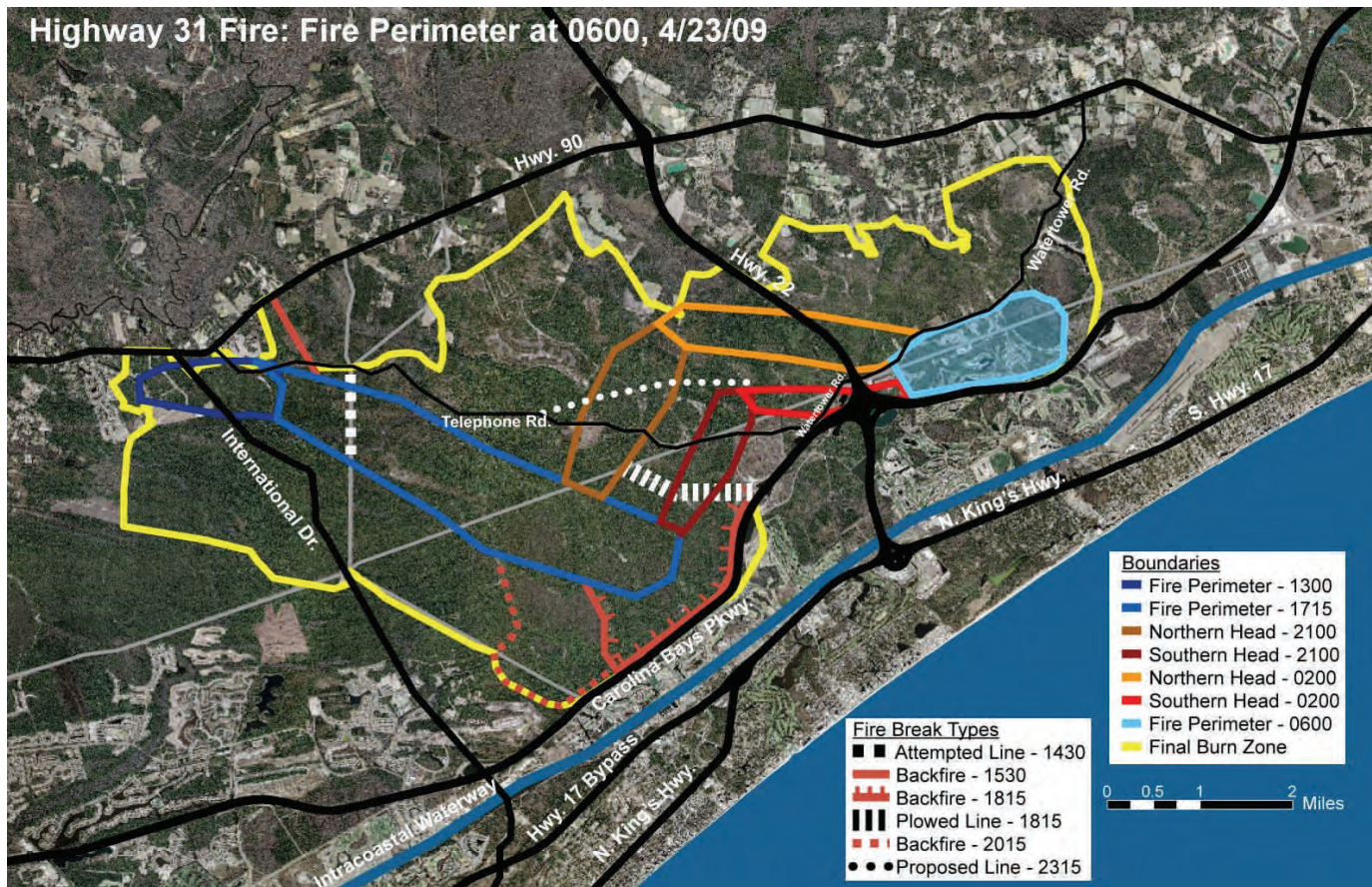
Outside the agency there were approximately 140 equipment resources and 579 personnel used to suppress the wildfire:

Horry County Fire and Rescue
 North Myrtle Beach Fire Dept
 Horry County GIS
 Horry County EMD and Georgetown County EMD
 Conway Police and Fire Departments
 US Forest Service
 SC and NC National Guard
 SC Firefighter Mobilization from all over the state (32 Fire Departments from outside Horry County)
 North Carolina fire departments and personnel
 NC Forest Service
 NIMO (National Incident Management Organization-Atlanta)
 Several agencies were involved: SCEMD, SCDOT, SCDNR, SC Highway Patrol, SCDHEC, SCDSS, FEMA, US Coast Guard, Red Cross
 Other organizations involved: Salvation Army, Loris Healthcare, Little River Water & Sewer, Waccamaw Baptist VOAD, Coastal RTA, Coastal Carolina University, and Myrtle Beach Chamber of Commerce

and many local individuals and businesses.



Highway 31 Fire Progression Map



Smoke on Roads

Smoke from the wildfire was a serious problem to the area. Three major highways were closed as needed due to smoke and flames. The impact was crippling to area residents and businesses. Highway 22 was closed from Highway 90 east towards Highway 17 until April 29. Highway 31 was closed from Highway 9 south to International Drive until April 30. Highway 90 was closed and opened as needed throughout the incident.



The travel restrictions added hours to normal travel time and congestion on smaller roads was heavy.





Smoke from the wildfire could be seen for miles and picked up on satellite imagery.

National Attention

The story of a major tourist area being threatened with wildfire and destruction caught the attention of the nation. Several press conferences were held during the event and there was nationwide media coverage. The CBS Evening News, Good Morning America, Today Show, CNN, The Weather Channel along with several local media outlets from SC, NC and GA covered the story.

A staging area for the media was established near the House of Blues Restaurant. Significant news organizations represented on this fire included: CBS Radio News, the CBS television network, NBC, ABC Radio/TV, WPDE, WBTW, WMBF, WIS, WSPA, WLTX, FOX Carolina, the Associated Press, *The Sun News*, *Post and Courier*, *The State*, News 14 Carolina, WWAY, WFXB, *The Sumter Item*, *Florence Morning News*, *Horry Independent* and others. Through wire services, uplinks and freelancers, fire coverage made its way to the *New York Times*, *USA Today* and major papers nationwide.

There were also visits to the area by Governor Mark Sanford, Congressman Henry Brown and local legislators.



Thousands of Lives Affected

Many lives were affected with evacuations, the loss of homes and then sifting through rubble and cleaning up. Many pets and animals were displaced.

In Barefoot Resort, 2,500 residents were evacuated. Hundreds on Hwy 90 evacuated, shelters were opened as needed.



Property

With developments on all sides of the fire; approximately 5,800 homes, several golf courses and businesses were threatened. Millions of dollars of property were protected including a water treatment facility and power substation in the area.

Miraculously, with a fire this size that spread so fast, no one was killed or injured.

Why did some homes burn and others survive?



Burning embers landed on flammable mulches and construction materials. Most homes in the Barefoot Resort had vinyl siding which melted from the heat, exposing flammable materials.



Commission Employees



Saturday morning briefing.



Friday night briefing.



Mike Bozzo, Horry Co., Steve Moore and Gene Kodama at morning briefing.



The Sunday morning briefing was held in very thick smog.



Thursday morning information collection.



Command and general Staff.



Matt Conner, Jeff Riffin and Sammy Connelly after a long day.



Employees at the Friday evening briefing.



Ops Chief Mike Ney with IC Mike Bozzo and Fire Chief Paul Watts.



Operations Chief Mike Ney at the Friday evening briefing.



Division supervisors at the morning briefing.



State Forester Gene Kodama at the Friday afternoon press conference.

Photos of Damage in Barefoot Resort



Plant and Animal Life

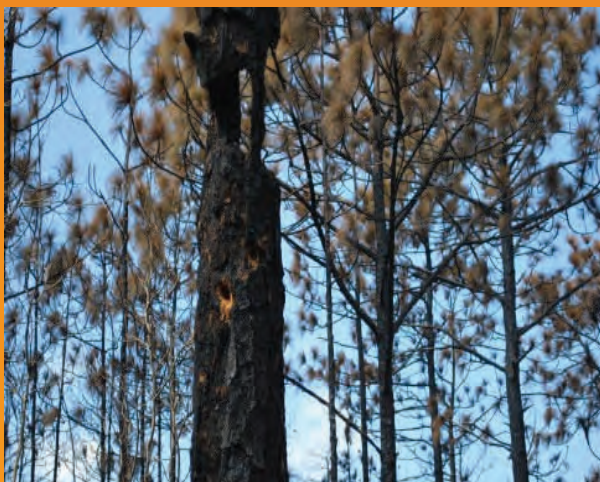
Lewis Ocean Bay Heritage Preserve is habitat for numerous rare plant and animal species. Fire actually helps some of the rare plant life flourish. Fire stimulates the forest by creating fertile seed beds that are available for plant growth. After a fire, more sunlight penetrates to the ground, establishing growth of plant species previously limited by shading.

Typical longleaf bay ecosystem plants that thrive on the acidic soil are: Venus' fly trap, hooded and yellow trumpet pitcher plants (*pictured right*), orange milk wart, sparkleberry, dwarf blueberry, sand milkweed, rosebud orchid and club moss. Within one week from the day the fire started, plants and grasses had started growing in the burnt understory. The longleaf ecosystem, a fire dependent system, should thrive after the fire.

Unique animal species found in Lewis Ocean Bay are the black bear, bald eagle, and red-cockaded woodpecker (RCW). In addition to the hundreds of bears, Lewis Ocean Bay is also home to deer, turkeys, quail, bobcats, coyotes, squirrels, fox and several snake species.

Wildlife habitat was heavily impacted from the wildfire. Luckily, only two of the 85 RCW trees burned (*pictured below left*). Their foraging habitat was disrupted, and it is hoped that the birds will move to other trees. The bald eagle nest with its fledglings was not located in the burnt area. Several black bears had to leave the area to escape the fire. Some fled to the interior wet areas, some moved north to the Waccamaw and a few headed south to rummage

through garbage cans near Coastal Carolina University. Since their habitat was disrupted, they are roaming. Tragically, three were killed on highways around the area within one week of the fire.



Fire Impact Estimates

Timber Damage:	\$17.0 million
Home Damage:	\$25.0 million
Vehicle Damage:	\$.3 million
SCFC Suppression Cost :	\$1.5 million
Cooperator Suppression Costs Reported:	.9 million
<u>Indirect Economic Impact and Rehabilitation Costs:</u>	<u>\$.3 million</u>
Total:	\$45.0 million plus

True wildfire costs have been found to be 2 to 30 times suppression costs. If a multiplier of 15 and a total suppression cost of \$3.5 million (SCFC and others) are assumed, the total cost would be approximately \$52 million. [Western Forestry Leadership Coalition, "True Cost of Wildfire"]

Fire Numbers

19,130 acres burned
 76 homes destroyed
 97 homes damaged
 1 SCFC dozer damaged
 1 SCFC transport truck damaged
 No deaths or injuries



With urban development growing in South Carolina and more people moving into the fire-prone wildland like this, a similar fire will most probably happen again. You need to be prepared for it. Make homes and communities as Firewise as possible, have evacuation plans and be careful with all outdoor burning.

**Flammable Fuels + WUI Growth +
 Perfect Fire Weather
 = South Carolina's Most Damaging
 Wildfire on Record**



TO RECEIVE A FULL PRINTED COPY:

We have a limited supply of copies remaining, but if you would like a hard copy of the full 56-page printed edition we ask that you make a donation to the Coastal SC American Red Cross. The Red Cross, among other organizations, played a key role in helping firefighters and those impacted by the Highway 31 wildfire, using over \$400,000 to do so. Donations will help them be ready for future disasters.

Please contact us at scfc@forestry.state.sc.us or call (803) 896-8800 to receive your copy.

Donations for your copy can be made to:

Coastal SC Red Cross
 RE: Highway 31 Fire
 2795 Pampas Drive
 Myrtle Beach, SC 29577

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